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DISCOURSE

Concerning the

SMALL POX.



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DISCOURSE

Concluding the

SMALL BOOK

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DISCOURSE

Concerning the

SMALL POX,

Occasioned by

Dr. HOLLAND'S

ESSAY, &c.

Wichamuel

In a LETTER to a Friend.

Si nous voulons repondre sincerement a ce qu'on nous demande, touchant la vertue de quelque remede, & de quelle maniere, il opere sur nos corps; nous dirons que nous sommes assure de l'effet du remede, mais que nous ne saurions rien dire de precis, touchant la maniere dont les particules du remede agissent sur nous, ceux qui feignent d'en savoir, ne veulent que duper les simples, qui s'en rapportent a eux.

Bibl. le Clerc, Tom. 26. p. 127.

L O N D O N,

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~~a. 1258.~~

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DISCOURSE

Concerning the

SMALL BOX

Created by





Dear SIR;



IN Order to fulfil the Engagements I am under to you, and to preserve to my self the Pleasure and Usefulness of your Correspondence, I take this Opportunity to send you some cursory Remarks I have made on Dr. *Holland's Essay on the Small Pox*, the Publication of which I gave you an Account of when you was last in Town. Were I to consider only the Regard I owe to your just Apprehensions in physical Matters, I should be more solicitous than I am about its Acceptance; but that Humanity, that Benevolence of Temper, which your Friends experience in their Acquaintance with you, prevents every Care or Uneasiness about it. I have this additional Satisfaction, to write to a Gentleman, who has no wrong Biass, from Interest or Applause, to confine his Judgment,

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or predetermine his Sentence. The Reason of whose Practice is founded on a Resolution to employ an easy Fortune, in doing disinterested, generous and useful Offices to his Neighbours and Tenants; so that if there should be the least Merit in this Performance, if I shall offer any useful Hints, nay, if but one, I shall have the Pleasure of knowing it from him, who is capable of improving it to much greater Advantage. I shall only add, that as you know my other Engagements in Life, so I have a natural Dislike, or rather Incapacity to close and laborious Study, and that these are only hasty, cursory and unconnected Remarks, which for my Memory's sake, only, at first, I took short Notes of, amidst other Affairs, and upon such particular Subjects and Occasions, when my Thoughts were hurrying on in a Train of Dependency, light and fleeting, easy and pleasant, at a late or early Hour, as my Time, Business or Inclination then suited me, without an after laborious Review, or Comparison with what others have thought or said on the same Subject.

In every Argumentation there ought to be certain evident Principles of Truth, in Order

der to deduce any just Conclusions. Whoever would argue about *Distempers* with a mechanical Exactness, ought to be possess'd of a particular Knowledge of every minute Adjustment of the Parts of the Body one to another, and this Knowledge must extend to every different Body; and by the Parts of the Body I not only mean the containing Vessels, or those Fibres or continuous Parts, either Internal or External, by which the Whole is connected together, but also all the circulating Fluids. He ought to be nicely acquainted with the Configurations, Dimensions, Quality, Number and Actions of the Particles of Matter thus fluidating, as well as the Capacities, Offices, Number and Condition of the Tubes in which they move, and whither there be a Justness or Excess of Proportion in either one of these to the other. Without the certain Knowledge of these first Principles, no certain Conclusions can be formed, and in Proportion to the Defect of these necessary Postulatas, will be the Uncertainty of all Reasonings about it.

And thus as to their *Cures*.

We have Ideas of Matter, or of something discernible, tactile, with respect to any Par-

cels of which, whatever Names are affixed to them, appear the same to every Eye, and give the same Sensation to every Touch; and when we have got the Idea with the Name, the Senses are Confirmations one to the other: If we see a Square, when we feel the angular Points and the Ridges of the Sides, and measure the Distances of them, this Feeling confirms the Idea. We have the Idea of Divisibility, by cutting it in two, four, twenty, or one hundred Parts: Of Weight, by its preponderating other Bodies: Of Tenacity by the less or greater Difficulty of separating different Bodies: Of greater or less Solidity or Fluidity by comparing one with the other, as Water with Lead, and the like. Our Idea of Matter is Complex, and arises from all the sensible Qualities of Bodies; and the Ideas we have of different Sorts of Matter, arises from the different Combinations, Figures, and Sizes of the Particles of it: We also see, feel, hear the different Effects of these differently combined, figured and sized Particles; and our Knowledge of Matter depends upon what we thus see, feel and hear of it; so that we can no where know without imploying these Senses about it; neither does or can any Thing,
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which is not miraculous, and beyond our possible Conception, happen in this System of Nature, but as depending on these Qualities in our Ideas ; for we cannot conceive of any Particles of it, but as obtaining some Figure or other, as having more or less Gravity, being combin'd in a greater or less Heap together, as being either at Rest or in Motion, slower or swifter : And though we cannot exactly adjust the Size, Figures and Combinations of these different Particles, yet still we have no other Ideas of it, but as depending on such Differences ; nor of the Causes of Distempers or Cures, but as owing to differently modified Matter : Foul, cutaneous Eruptions, and Mercury, Antimony, &c. which remove them, are all Combinations of what we call Matter ; but whence these different Modifications proceed, and upon what this Weight, this Volatility, &c. by which Diseases come, and Cures are performed, depend ; how Matter comes thus to act upon Matter, and some Parcels of it to be as it were contrary to others, cannot be accounted for, but from the impressive Power of *immense Divinity*.

I say, it is beyond the Reach of our limited Capacities otherwise to account nicely for
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the different internal Combinations of Matter, their Figures, Motion, Numbers, Sizes, &c. which variously *distemper* the Body, or in what particular Manner it is necessary other Particles of Matter should be divided, figur'd, what Degree of Motion is just necessary, and in what particular Places it ought to act, in order to *cure these Distempers* ; or if this could be known, there would be an equal Difficulty in adjusting the proper Figures, Sizes, Combinations, and producing this necessary Motion, when and where precisely there is Occasion for it, since Matter acts as it is impelled upon, and is in it self Inert and Unactive ; but in this Case, as the particular Parts distempered are out of our View or Reach, in the secret Recesses of the Body ; Matter, or every Particle of it we use, ought to be endued with Sense, Reason and Liberty, to take Directions, and act according to them, in Order to effect these Purposes.

As Matter is capable of infinite Variations, so we certainly know that it is in a continual Flux, or Circulation, or Change ; the finely subtilized Parts of Æther (which, by the way, may we not consider as the Stamina of all the succeeding Changes ? Do they not consist of
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those Parts which make those after differing Bodies ? Are there not the Principles of Nitre, Lead, Moisture and other Bodies mixed or fluctuating together ?) condensing into a compound Drop, may be further thickned into a Spire of Grass, or expanded into a medicinal Leaf ; then changes into the Substance of an Animal (part being thrown off, and the rest assimilated with its Juices or Solids) and, after a long Succession of Alterations, recondenses or divides, or at last resolves into the heap or aggregated Mass, whence reviving it rises anew, to the Supply or Nourishment of different Bodies, animate or inanimate ; so that Æther, Fire, Water, Food, Blood, Gold, Earth, are all composed or formed from the same Principles or Kind of Substance, only held in different Combinations, and differently modified by the great Author, Governor and Preserver of Nature.

But though we can no otherwise account for this Variation, or adjust these Qualities in an exact Proportion, with regard to Heat, Air, Water, &c. yet their known and constant Effects will be a Guide to us : They have certain natural, and distinct Properties, the Exertion of which, manifest their Presence, at least,

least, in our Ideas. Further, with the Ideas we have of Matter, are connected Ideas of certain *Differences* or *Contrarieties* of some to the others, such as Motion to Rest, Heat to Cold, Water to Fire, &c. or an exceeded Proportion of either of these : And on these two Principles seem to depend the most reasonable and successful Rules of Practice, *viz.* The Knowledge of the Properties and Effects of Bodies, or Matter under such particular Modifications which we are acquainted with ; and this Difference, this Contrariety, this Opposition of one to another, in which Principles are involv'd as much as we can know of Symptoms or Cures ; for after all we know of Anatomy or Mechanicks, we cannot tell the precise Point affected, or adjust the Figure, Motion, &c. of Bodies to the particular Necessity of the Case ; but from the Symptoms and Knowledge of the Properties of Simples, we may form a Rule of Practice. And in this Manner, Sir, I proceed.

I consider every Thing as Matter, or the same Sort of Substance in its original Constitution and Principles, but as differently modified in different Conjunctions, and under different Appearances, which we cannot account

count for, which are too abstruse and remote from our bounded and narrow Capacities; and therefore I found the Whole of my Reflections upon evident Facts or Principles throughout Nature, *viz.* Air, Heat, Water, &c. and have regularly proceeded upon the natural Properties of each, and the Opposition they in any Degree stand in one to another. If I reflect upon the Nature of Cold, thus far I am clear, that there is an Absence of Heat, and *vice versa*; that they give absolutely different Sensations, or stand in the greatest Contrariety of Nature one to the other, in that the Application or conveying of one intirely removes, or in other Words, is a Cure for the other. If I think of Thirst, I consider it as an animal as my own Sensation, occasioned by Driness of the Parts, it being the Property of Heat to evaporate Moisture, bearing it aloft in small Particles; that therefore Moisture or Liquids are to be apply'd as the Opposite or Cure of this Thirst or Driness. The same is to be said of Motion and Wakefulness, as they stand in Opposition to Rest and Sleep, &c. and the distemper'd Excesses of any of them. Our Enquiries are vainly curious about what Fire or Heat is, by what particu-

lar Motion or Degrees of Motion in Bodies it is occasioned ; whither owing to reciprocal Collisions, Velocities, Subtilties ; these prime Causes of it, may, perhaps, never be investigated, our Eyes and Understandings are too gross to understand them, and to reason from them is no better than upon an imaginary Foundation, to raise a like Superstructure : and this is always the Case with those who make Principles or Causes of their own, or take others for granted, which were never proved, and then reason from them to Consequences and Effects. Whereas by stating uniform, invariable Facts, Properties and Effects ; 'tis probable, upon due Consideration, we may be able to make some Judgment of the Cause, and arrive up to some necessary first Principles.

When it is said, that a *Fewer is necessary to throw off the variolous Matter from the Blood*, the Meaning must be this, that a particular Sort of Particles are got into the Blood, which are not of its Nature, which will impede a natural and salutary Circulation ; that these Particles are to be separated from the rest ; that this Separation must be by the Pustules, and that it cannot be brought about
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but by this encreased Heat and Quickness of the Blood, as the necessary and salutary Cause: Or else, it supposes the Particles to be homogeneous with the rest of the Blood, and that there is only too great a Quantity of them. Which ever of these be supposed, there seems to be an Impropriety in expressing the Fever to be the salutary Efficient, *necessary (sine qua non)* to produce the Eruption, in as much as it is only a conjunct Circumstance with it, both arising from the same Cause.

A Fever seems to consist of a heated Blood; this is occasioned by the Air (joined with other Circumstances, which I shall afterwards explain) in Inspiration by the Lungs, Stomach, and that which is taken in with our solid or liquid Aliments, which fans up the Heat to an undue Proportion. Heat never alters its Essence, but is the same in a Fever as in a Fire. The Air fans up the natural and salutary Heat of the Body. Heat is not so denominated from Flame, but Flame is a Modus or Degree of Heat. Some things are more susceptible of being blown up than others, into an Heat, which may be equally the Case of the Blood, as of other Parcels of Matter, external, or which are taken into the Blood,

consisting of Particles of different Figures and Subtleties ; and thus far the foregoing Theory of *Matter* may be of Use in our Enquiries.

Dr. *Holland* in a Chapter * wrote against Bleeding in this Disease, observes, that *when the Fever runs high, when there is or seems to be a Plethora or Inflammation, Physicians generally order opening a Vein, intending thereby to diminish the too great Quantity of Blood or Inflammation, by giving Room for a freer Circulation, and to make a Revulsion from the PARTS AFFECTED.* The Doctor may be supposed to mean here an Inflammation upon some particular Parts ; for supposing the whole Mass of Blood be inflamed, rarified and accelerated, the Bleeding must then be intended to take off from the Pressure on the Sides of the Vessels which would endanger their Rupture ; or (not to give a freer, but) to procure a more gentle and slow Circulation ; to promote the Expulsion of some of the more heated Particles, in order to introduce into the Blood more soft and cooling Fluids, and thus allay its Heat, which would occasion Inflammations, Contractions and Obstructions of particular Parts. And this we will allow

* *Holland's Obs.* p. 94.

low him to be the Intention. But the Doctor is convinced that *this Fever, † this Plethora, this Inflammation, is a necessary Instrument to promote a salutary Crisis by the Glands of the Skin, and separate the infected Humours from the Blood,* even though the Head, Back, &c. should be *vehemently affected* by it. No Body doubts but that a Fever is supposed necessarily existing with the Eruption of the Small Pox ; but the Distinction lies in the Degree of it, and its being necessary, either as an Instrument or joint Circumstance : For if it be always *necessary* (the Doctor having put no Limits, as to Time or Degree) as the proper *Instrument* of Nature, Bleeding, which abates it, must be certainly always wrong ; but if it be only a Circumstance or Consequence, or be too violent, Bleeding may be serviceable, which is what I contend for.

The Violence of the Fever, and Vehemence of the Pains, do not seem so properly to be the salutary, *necessary Instruments* to throw out the Small Pox, as the *necessary Consequence* of there being great Quantities or Numbers of subtle, heated Particles in the Blood, which, according to the Properties of
such

† P. 95.

such Particles, will go on at first to move where there is the least Resistance, which in this Case are the larger and more open Tubes of the Body ; but this Heat being continually more encreased by the Inspiration or Introduction of Air (as in similar Cases) must, at least, increase the Distension and consequent Pain of the Vessels in which it circulates, if it does not obstruct in them. By the Opening a Vein therefore, the Quantity of Heat is immediately lessened, the painful Distension of the Vessels relieved, and the remaining Heat rages about less impetuously, by which Means an Opportunity is procured for the inflamed Particles to penetrate or insinuate themselves, with abated Violence, through the other and less pervious Outlets of the Body.

But if no Vent be given to the encreasing Heat, it may arrive to such a Degree as to obstruct in, destroy or burst the Vessels ; to occasion mortal Hemorrhages, Extravasations, Spots, Suffocations, and the like ; and the miserable Patient may die in a Flame or universal Mortification. For these obvious Reasons, I can by no Means agree with what the Doctor observes, that * *the dangerous and fatal*

* P. 95, 96.

tal Symptoms in a nine Days Pock, arise from the Want of a sufficient Fever to produce a genuine Eruption, because the very Matter or Support of this Fever, and the producing Cause of the Eruption, which are the heated Particles in the Blood, are what occasion the dangerous and fatal Symptoms; and the larger their Quantity, the more dangerous and fatal must they be; so that the fixing of the variolous Matter upon the Throat, Lungs, Stomach or Intestines, must be owing to the Number, Violence and Confinement of the heated Particles. And this indeed seems to be pointed out by Nature, or by our natural Reasonings, in similar Cases, where-ever Heat is confined; Heat being ever of the same Nature, in every Circumstance of Time and Place; and from this clear and evident Principle, from the known and universal Properties of it, can we only reason with any Certainty about it. And indeed, I think Heat seems to be the distinguishing Characteristick of a Fever. A symptomatick Quickness of the Blood's Motion may be supposed, where this encreased Heat does not exist, arising from an Obstruction in, or Rupture of some of the Tubes, or an increased Quantity

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of the watery Fluids in the Blood, as in Jaundices and Dropsies; though in Case of Obstructions, where that Degree of Heat, which should move in a greater, is now pent up in a less Compass, and there is not, by Reason of these Obstructions, a proportion'd Discharge by the Outlets, and being continually ventilated by the Air, there is generally a Fever follows: It is of the same Nature in Colds taken, where the Heat, which should steam out, being pent in by the Constriction of the Pores, must necessarily encrease and spread.

These Principles might seem to an unwary Reader, to be shock'd by an Observation of Sydenham's, in his Letter to Dr. Cole, * viz. *That he did not think Bleeding, ever so early, abated the Inflammation, so much as fresh Air.* But let it be considered, that it is not the Air received by Inspiration, which abates this Heat, any more than gusts of Wind let to the inside of an House, would mitigate the Flames which are consuming it; but it happens by taking away that outward Cause of Confinement, which hinders its Evaporation; and this the Maxims and Experiments in Philosophy will justify; so that Bleeding, and the fresh
Air

* P. 100.

Air seem to coincide in their Effects to the Relief of the Patient. † *A young Woman, says our Author from SYDENHAM, was cured of the Rheumatism by frequent and plentiful Blood-letting, and then taken ill of the Small Pox, the worst Sort, and which kill'd her on the eleventh Day.* From whence the Conclusion is, that Bleeding is in no Case useful, before the Eruption of the Small Pox: Though I think this an unfair Way to argue from a particular Case to a general Rule. Let us examine whether the following Conjecture may not appear very probable, and solve the Difficulty. I shall first suppose that this Patient had not taken in a proportionate Supply of suitable Fluids to this Quantity of lost Blood; the frequent Bleeding therefore must render the Vessels less distended, diminish the Heat, and the Quantity of Fluid; all which are the great and apparent Causes of the Blood's Motion: So that by the lessened Fluid, the Resistance consequent upon the Distension of the contractile Vessels, and from hence, their Impulse to progressive Motion, is, in Proportion, abated, and the Flame or vital Heat becomes languid and sunk. The Circulation being thus render'd

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† P. 100.

very slow, and the Heat diminished, there must follow a lessened Rarefaction, an encreased Density, an Adhesion or Union of some, and Separation and Subsidence of other Parts of this compounded Fluid, all which adds to the Hindrance and Irregularity of its Motion, and every differently appearing Fluid, more languidly separates through its proper Channels: By this Languor, this encreased Subsidence and Density, Obstructions must necessarily arise in the smaller and more complicated Tubes; Humours must be settled and lodg'd, from whence, for want of proper Motion and Heat, perhaps, Putrefactions: These Obstructions multiplying through the Body, the Air, continually ventilating the remaining Heat, must blow up the Sparks; and, by the Obstructions, its Force being confin'd to a narrower Space, and an absolute Resistance made, where those Obstructions are, its Stroke must be rebounded and multiplied, and by new Accessions and Repercussions, encreased to such a Degree, as will blow up a Flame capable of dislodging and driving out those latent and obstructing Particles, lodg'd universally over the Body, through the more distant and superficial Outlets; otherwise if the resisting

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Obstructions should exceed the impulsive Power, here are new and violent Agitations, the Vessels may be broke, destroy'd or mortally obstructed.

The very Nature of these Particles would incline one to think, from the preceding Discourse, that where the Motion was slowest, and the Heat least, there they should cohere and pass most difficultly, which is the Case with respect to the superficial or cuticular Ducts, and which may account, in some Measure, for the particular Appearance of the pustular Eruption, and which will hereafter be more fully explained. From hence we have leave to imagine, perhaps, with a good Degree of Probability, that the first and original Compactness of the Vessels, the Strictures of their Offices, their intense Elasticity upon Distension, might be the Reason of this universal Obstruction, (other Accidents assisting, and a Disposition of the Blood) which being once removed, might become so ductile, flexible and open, as never more to be so obstructed: Thus I would attempt to account why it happens but once; and from this Theory it may appear, that manifold may be the Accidents, causing, or bringing on at any parti-

cular Time, the *Small Pox*, viz. Indigestions, Colds, Frights, or any Thing which may violently agitate or inflame the Blood, and cause Obstructions in its Vessels.

But let us enquire a little further. Our Author has the following Passage from *Fernelius*,
 “ *Sanguis Phlebotomia concitatus promptius*
 “ *labem contrahit, quemadmodum aqua cui*
 “ *Fellis tantulum injeceris, si agitetur, oci-*
 “ *us quam si consistat amarescet, quinetiam*
 “ *vires evacuatione iminute, insilienti perni-*
 “ *ciei minus obsistunt.*” The Question is, What he means by this *labes*, this *perniciēs insiliens*, or as it is called by different Authors, Infection, Contagion, and by Dr. *Holland*, infected Particles, &c. what it is, and how occasioned? Let us examine the Facts. It is often Epidemical, *i. e.* attacks many at a particular Season, in consequence the Season, *i. e.* the Air is the Cause. Sometimes it happens when it is not Epidemick, and is dependant, sometimes on previous Accidents, such as Colds, hot Liquors inflaming the Blood, &c. and sometimes this *Fever* is raised, when no particular Accident can be judg’d as the Cause; from all taken together, an adventitious and extraordinary Heat in the Vessels

sels or Blood, seems the most obvious Cause, or those fine or subtle Particles of Matter, capable of producing the Sensation of Heat; such Particles, differing only in Degree, as by their genial Influences, agitate and operate through universal Nature; such as give Motion or Circulation to all vegetating or growing Bodies, which first divide that adhesive Matter, from which the *Grape*, the *Corn*, the *Wine*, the *Spirit*, the *Sulphur*, and all inflammable Bodies are produced, and into which they are again *capable* of Reduction. And were Stones or Plants indued by the great Creator, with Faculties capable of Sensibility, they would receive the same Sensation from this universal and vital Principle, which operates on them, and to their Production; Heat being only an animal Sensation of such Operations: Such Particles as by new and continued Accessions, being driven one by another, must, where there is an Obstruction, find another Passage, or divide or destroy the Parts to make its Exit; which brings me to consider next, that this *Labes*, this *Pernicies*, is communicated when the Pocks are mature, they being then nearest to their original Fineness or Subtlety; or the many coloured, mix'd Appear-

pearances of the Particles of Matter are blended, and infinitely divided by the Air and Heat, so as to be render'd more capable of quicker Action, of penetrating, of infinitely dividing Bodies, of multiplying their impulse, *Undiquaque*, of diverting the more direct and regular Motion of other Particles, (I mean here the Blood's Circulation) and thus obstructing, contracting, and performing all its other resistless Operations.

The first Symptom is a Coldness and Shivering. This Sensation of Cold must be owing to some Cause which obstructs or pens up the Heat from the Parts thus cold, which are the Superficies of the Body; for were it equally diffus'd, and its Motion every where equal, 'tis impossible but it must occasion its genuine Sensation; Heat, or the Cause of it, being, as we have observ'd, of an uniform Nature, and would ever produce Effects in just Proportion to its Place and Degree. It is probable the Siziness of the Liquids may be the *internal* obstructing Cause of this Sensation: And this Siziness may be occasion'd, either by the Evaporation of the thinner Parts, or by internal Obstructions of the Lacteals, &c. impeding the natural Progress of the Blood,
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which natural Progress depends upon a proportion'd Supply or Accession of this Heat to every part ; but this Supply, this Accession being defective and impeded, must more externally become languid, and in consequence the Vessels must subside, and the Fluids be more condens'd. Perhaps the more *immediate* and outward Cause of this Sensation of Cold, is, the Action of the Air upon the external Orifices of the Ducts, *inverting* the Motion of the Blood in which the Heat is contain'd. For where there is any Force or Weight, that Force or Weight must squeeze or compress, and if this Squeezing or Pressure happen upon the Orifices of Tubes containing any circulating Fluid, it must, at least, retard such Circulation, if not turn it inward. The Air which thus externally may be the Agent producing this Sensation of Cold upon the Surfaces, encreases the Heat, and blows up the Flame within : And thus as to the Shivering or Vibration of the Body ; though this Vibration be of the intire Limbs or Trunk, yet the Sensation of Cold is more *superficial*, so that *there* is the Defect of Heat, and *there* likewise must be the Cause of this Vibration ; the Motion of the Blood being impeded by
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inward Obstructions, and the Heat, in consequence, less outward, the external Air velli-cating or successively striking upon the Cuticle, thus shakes the Body by connexion or consent of Parts.

That Propensity to Sweat in Adults, from which *Sydenham* concludes, they will not run together, *page 32.* flows from the Relaxation of the Vessels, the infinite Subtlety of the Parts, and the Obstructions being broke thro'. It may be reasonable to suppose, had the Vessels been so contracted, or the Obstructions so great, as to have detain'd this evaporating Fluid in the Blood, greater Commotions would have been occasion'd, and the best the Patient could have expected, would have been a happy Escape from the most aggravated and dangerous Symptoms of a Flux Kind: But these very Particles which would have been the Matter, the Fuel, the Support of these Symptoms, evaporate. What extraneous, heterogene Particles are here? What *ignota contagio*? What but the common Phenomena of a heated and circulating Fluid?

The Sensation of pricking o'er the Body, may be rais'd by the thin, subtilised Particles
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of Blood, projected or spouted, at each resisting and impulsive Contraction of its Vessels, from the minute capillary Orifices, against the resisting Membrane of the Cuticle.

Fits, or that impotent, insensible, lifeless Condition, which is often observ'd in Children, most evidently denote internal Obstructions, and a Detention of the *animal Spirits*, or, in plainer Words, of the circulating Heat and Fluid, from the exterior Parts, by that Paleness of the Looks, occasion'd by the less'n'd Rarefaction of the Blood, and the consequent Subsidence of the Vessels in the Face thus pale: The violent, irregular Agitations, Throbs or Vellications occasion'd by these Obstructions, produce those horrid Grimaces, those quick and sudden Distorsions of the Features, and Contractions of the Limbs: And all this is confirm'd from the ensuing Eruption of the heated Blood in florid or sanguineous Points, which free the tender Patient from those Symptoms the Obstruction and Detention occasion'd.

The violent Heat, quick Pulse, Pains in the Head, Back, &c. being thus accounted for, I shall endeavour to assign the Cause of the striking in of the Eruption, as also the Reason of

the Eruption it self. The Blood being vehemently rarified by an encreas'd Number of the Particles of Heat, such Particles must either find their Way out of the Body, or, by continually augmenting their Number and Quantity, must, at last, subtilise the Blood to such a Degree, as to break the Vessels, separate the Solids, and dissolve the Union necessary to Life: If after a Discharge, thro' the arterial Ramifications, upon the Superficies, of some of the heated Particles, the internal Heat should be still encreasing, and rage to such a degree as to obstruct in some of the principal Channels, and prevent the regular Succession and impulsive Progression outwards of the Fluids; the Heat in those more external Tubes abated, the Tubes themselves must subside, the Motion of the Fluids be more slow, and the Particles lodg'd upon the Superficies, must relapse into the Vessels, from whence they were before protruded, or be return'd into the Veins; and this must be assisted by the continual Weight of the circumambient Air, the compressive Force of which must be encreas'd in Proportion to the Abatement within; and this is, indeed, a formidable Symptom; the Air adding a dead Weight to the Obstructions, and aggravating all the Evils arising from

from them. But the Symptoms abate upon a complete Eruption, the internal Obstructions being broke through, by continued Accessions, and renewed Impulses of the Particles of heated Blood; and a Discharge is procur'd for the more inflam'd Parts, to the Superficies, which carry along with them other Parts of the circulating Fluids, as well as those which it abrades off, in its Passage, from the Solids: (For upon the Admission of any inflammable Particles into the Blood, the natural Heat and continual Ventilation of the Air, will more subtilise these Particles, and thus the Heat will still increase.) The more subtile Particles of Heat flying off, leaves the remaining Blood or Matter more thick or heavy under the Cuticle, which being unnaturally distended, the orificial Sides longitudinally unite, and thus resisting or obstructing to the more regular Motion, or discharge of the Blood, or Heat, must give new Agitation to each progressive Impulse upon the Base of this confin'd Blood, by which means it divides the Solids where this Agitation is, and *makes the Escar*; till by continued Strokes, and new Agitations, the Parts of the obstructing Blood are so finely divided, as to yield a way for an easy Escape of the Heat through them. And

thus Eruption and Maturation may be perform'd.

Vomiting, or the Hindrance of the quiet and regular Action of the Stomach, plainly denote violent Agitations; the natural compressive Motions downwards being inverted, as plainly indicate, Obstructions of the Vessels, join'd to these Agitations.

Dizziness may, probably, be occasion'd by the swift Circulation of the Heat; there being a *certain* Pause of Time, and Rest of that part of the Coat of the Eye, or of the Nerve upon which the Objects strike, necessary, in order to the Minds considering it in a fix'd Place; but the internal Stroke or Pulsation being so quick repeated, hinders the Attention requisite to such a Consideration, and therefore with the too frequent distentive Throb upon the Vessel, the Objects seem to follow the Motion, to be lifted up and carried out of their Places; even when laid down, and Objects disappear, this rapid Motion of the Heat seems still to whirl the Patient round.

The Dancing of Objects may be caus'd by the Vibration of the *distended* Coat, struck upon by external Bodies.

Inquietude, Watchings, Delirium, or the confus'd Assemblage of Ideas, and the imaginary

nary Representation of Objects, may be accounted for, with little Variation, from the same Causes.

As to frightful Sleeps, I shall observe, that Objects presenting on a sudden, with any quick or perturbed Motion, surprize to a great Degree, Persons in Health; this the Fever, or rapid Circulation and tumultuous Agitation of the Particles of Heat will effect, perhaps, by occasioning such Sensations, as were impress'd by former *Objects*, and thus reviving the Memory of *them*.

I shall now *attempt* to explain, from their natural Causes, the distemper'd Changes of the more fluid and watery Parts of the Blood:

And I shall first offer a Hint in regard to the Law or Cause of Circulation: There appears to be a Necessity of Perspiration from the repeated elastick Propulsion (occasion'd by the Air) of the Tubes; and there is this Dependence of Parts or Circumstances one on another, throughout the whole Body; When the Matter fitted for Perspiration is thrown off, fresh Accessions succeed into the Vessels through the larger Arteries; and thus again to the Arteries, from the Chyle, which
Chyle

Chyle coming from the Stomach, leaves that empty, with a painful Sensation of the Want of a new Supply of Aliments. If I may be allow'd to introduce a Conjecture here, May we not suppose the Air, striking on, or, by the Heat unduly expanding upon, the naked and tender Coats of the Stomach when it is empty, that gives the Sensation of Hunger? This being only a painful Sensation of a *particular Part*; that the Mode or Kind of this Pain is peculiar, may be owing to the Situation, or other *particular* Circumstances of a *particular Part*, and is no Objection to this Theory. So that, the Pain occasion'd upon a Nerve through the Hollow of a decay'd Tooth, and this painful Sensation of Hunger, may arise from much the same Cause, *viz.* an Impulse of the Air: And is not the close Confinement from the Air, of an Infant in the Womb, the Reason of its not feeling this Sensation? And the immediate Admission of Air, when it is born, the Reason of its as immediate Want and Craving?

The more solid and liquid Aliments are taken into the Stomach, there by the reciprocal Actions of Air and Heat, they are comminuted and blended, (and the more fine and
 inti-

intimately so, the more regular and natural the Motion of the Stomach is ; in consequence the more irregular or disordered it is, the more crude or imperfect must the Digestion be, and this imperfectly digested Matter by obstructing in the Lacteals may often give rise to Fevers) and are afterwards received into the Bowels ; thence they are slowly elaborated, by the same powerful Operations, through all the fine chyloferous Meanders. Hitherto an extraordinary Proportion of this watery Liquid seems necessary to prevent Inflammation and Obstruction in those small and pent up Ducts ; together with the close Pressure and Warmth of the inclosing Parts, the oily, saline and bitter Juices, to smoothe their Passage, to keep them connected, to vellicate or contract the Vessels to their more easy Protrusion onwards, to insinuate into their Pores, and attenuate their Parts. These Offices being perform'd, it being necessary, in order to a due and quick Supply of vital Heat to all the Parts of the Body, that the Motion should be encreas'd, the superfluous Liquid is drain'd off by the Kidnies, in order to dissolve, or take away the Cause, of that too strict Adhesion or Mixture of all the Parts ; to set them free, and
put

put them thereby into a Capacity, *more fitly* to adhere, in order to retain and convey this Heat (and thus the different Adhesions and Configurations of the component Particles produce the Alteration of Colour.) The extraordinary Subtilisation of the Blood, Obstructions in other Parts, together with the distended or widened Orifices of the Tubes by this encreas'd Heat, occasion bloody Urine, the subtilis'd Particles of Blood being violently carried through with the other Fluid. An Obstruction of these Orifices, by the same tumultuous Agitation, cause the Suppression of Urine: And where there is not a due Separation by the Kidnies, or the other excretory Vessels (all Parts being alike subject to this inflam'd State) this Fluid will endeavour, by the Laws of Matter and Motion, to pass through the next most convenient, or larger Pipes, which are the Glands situated about the Stomach, Mouth and Throat; the lighter Parts flying off first, or being in great measure evaporated, will leave the rest more thick and sluggish; and thus the Salivation or profuse Spitting may be accounted for. Or should the Obstructions encrease in the Lacteals, or the Stomach and Bowels be vehemently relaxed by

the Violence of the Fever an obstinate Looseness is brought on.

Further, when the Urine is pale, it is plain that only the softest, most insinuating, the lightest and smallest Parts transude, the larger, earthy, heavier and more attractive, being detained in the Blood: These, by Reason of the Obstructions, the Rarefaction of the Blood, the consequent Distention and impeded Contraction of the Vessels, together with the Steaming out of the more subtiliz'd Parts, and the encreased attractive Density of the rest, subside or adhere to the Sides or Orifices of the Vessels, till the Obstructions are removed, and the Vessels recover their Spring, when these Particles are thrown off by the Kidnies, and thus produce a turbid and separated Urine: Or else, by the tumultuous, internal Agitation of the heated Fluid, they are forced into more or less frequent Contacts, greater or less Combinations, and thus come off, high coloured, or muddy and unseparated from it.

The Redness of the intermediate Spaces is caused by the Rarefaction of the Blood and Distention of the Vessels, the Obstructions within being removed, and the Heat more

External ; and the Consequence of this, in justly agreeing Order, of Time and Disease, is, the proportioned Swelling, or Enlargement of the several Parts of the Body.

The Maturation of the Pock, as I have observed, arising from the subtile Division of its Parts, by the Penetration, Force and Escape of Heat, so also the Cuticle-being elevated, or removed from its Connection, distended and dried by the Heat, now begins to grow rough, to moulder or separate.

The dangerous Flaccidity and Whiteness of the Spaces in the last Stage of this Disease, may depend on the weakned Tone of the Vessels, incapable any longer of contracting with Strength sufficient to propel the Heat and Fluids outwards ; and thus the internal Obstructions are renewed, by Means of which, that due Supply of subtile, coactive Particles, necessary to penetrate, divide and maturate the Pustules, becomes wanting, which, on that Account, continue red. And thus the Sweating suddenly ceases, the Vessels subside, the Skin relaxes, the Patient becomes delirious, sick, restless — dies.

That this Distemper generally proves more favourable to Infants than Adults, may arise from
from

from all the Parts of the Body, being lax, and not so springy, and consequently they do not give such Force to the Air, or so much encrease the Heat.

I shall now, from the joint View of the Appearances peculiar to this Distemper, and the natural and known Properties of Medicines, enquire what Methods seem best adapted to the salutary Management of the Patient; and here the Symptoms themselves are, in general, sufficiently directive. The Patient's Inability and Weakness dictates a Cessation from Action, and Rest of Body. The Heat and Drought, cooling Liquids: A Care to avoid all external or internal Means of increasing it, either by constricting the Pores by a cold Air, or aggravating the inward Flames, by introducing fresh Fuel. A Sense of Faintness, suitable Nourishment, such as Broths and Gruels. And this appears as enough in the mild and gentle Sorts; where the Heat and Pains are moderate, and require neither Bleeding or Medicines, but only the friendly Interposition of the Doctor to prevent the mischievous Impertinence, of domestick Quackery.

But if the Heat rages violently, the Pains consequent on this Rarefaction also vehement,

the Eyes red, and the Breathing very difficult, then Bleeding seems necessary to allay and mitigate them ; and that at first, in order to prevent that increased Putrefaction or Separation of the Parts, with altered Figures, Cohesions and Colour, often evident upon late Bleeding ; which Parts so corrupted, may increase the Obstructions, and every consequent Symptom. No Cause so natural can be assigned for this Corruption of the Crassamentum, as the Continuance and Increase of the Heat in the close Vessels, agitating upon, breaking the Texture, dividing and destroying Part of the Mass circulating in them. And this the Appearances of any inflammatory Swelling, with the consequent Abscess, or the Destruction, or rather fine Division of the solid Parts or Vessels into a State of Fluidity or Maturation will evidence ; For,

1. The increased Redness can be occasioned only by Blood confin'd.

2. The Sensation of Heat, from Heat, or the same Sort or Modification of Matter, which in any other Time or Place, with its Cause of Action attending it, would produce similar Effects, or give the same Sensation.

3. This

3. This Heat must be increasing, or there must be continued Accessions of fresh Particles of it, and the Freedom of its Progress and Evaporation must be impeded ; For the Heat, according to the universal Property of it, would immediately pervade and fly off, were there no Obstructions ; but by the same known Laws of it, when any Part escapes, and where it is mixed with a compound Fluid, it must subtilize and carry off with it the lightest or most divided Parts of the Fluid it is mixed with.

4. The remaining Parts must be therefore more viscid or adhesive, and consequently still more obstruct its Passage.

5. Therefore the circumambient Parts must swell and be in Pain, for Heat is expansive, and the Parts are unnaturally distended.

6. Where-ever it is confined, there it violently *throbs*, or agitates, and exerts its Power upon the resisting Medium, and till it gets free, continues to divide or destroy all about it ; but in this Case the Vessels themselves are destroy'd, and in consequence,

7. Upon this Division, the Particles before confined by the Obstruction, make their Escape, and the Sensation of Heat and Pain ceases.

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Corollary 1. The Difference between Boils, inflamed Throats, Fevers and the Small Pox, seem to be only that the Heat and Obstructions are different in their Degrees; that in one Case they fix on a particular Part, and are more External, and in the other are more Universal or Interior.

2. Bleeding preserves the natural Strength, by abating that expansive Power, and taking off that Pressure from the Vessels, which would relax and weaken them.

If after the Bleeding, or in the Course of the Disease, the Patient should have a Sense of great Faintness, with a low, trembling, or undulating Pulse, Syncope, Stupidity, Palpitation of the Heart, or other such like Symptoms, arising from a Defect of salutary Heat, or the weakened Elasticity of the Vessels; he is to be relieved by proper Nourishment, or by Cordials, such as a little warm Wine, volatile Spirits, the Species Diambrae, Camphor, or the Bark join'd with Volatiles; or if it arises from an untimely Looseness, by Opiats join'd with Astringents and Cordials, as the particular Circumstances of the Case may require. I shall take the Liberty to subjoin here, that where there is a great Fulness of Blood join'd with

with Obstructions, we often find it evidenced by a low, sluggish Pulse, bloated or glaring Eyes, and a Swelling and Blueness of all the larger Veins; which, upon Bleeding, subside, and the Pulse becomes more strong and quick; and this may serve for a Distinction between a proper *Pletthora* and *Inflammation*, and why the latter may be consequent upon the former, even after Bleeding. It is reasonable to suppose, that every Moment's Continuance of a *Pletthora*, must, as it confines a greater Quantity of Air, heat or inflame the Blood, which shews the Necessity of soon Bleeding in a Plethora.

Bleeding being performed, the Spirit of Vitriol comes next into Consideration, which *Doctor Holland*, * with an authoritative Air, revives and recommends to the World, † amply illustrating its Efficacy by a borrowed and long since known Case of *Sydenham's*. Therefore after all this Pomp, I shall only add, that Acids seem in this Case very properly to succeed, as they are astringent or contracting, to act upon the Blood, or connect it in such a Manner as to prevent that Subtilization or Division of its Parts, previous or necessary to this Corruption, (onwh ich Subtilization, together

* P. 127.

† P. 130.

gether with the Rapidity of the Heat which causes it, depend the Hæmorrhages, purple Spots, and other dangerous Symptoms) and even to contract the Power of the expansive Heat it self.

I shall now endeavour to explain the Uses of Dilution, by considering the Properties of a simple, aqueous Fluid, and its absolute contrariety of Nature to Heat. And I shall observe that to be the most simple Fluid which is cold, insipid and transparent ; for if it be hot, impresses any particular Sensation of Taste, as distinct from a smooth Sensibility of Contact, or if it be colour'd, these are evident Marks that the Fluid is mix'd and compound, or that there are other Particles floating in it.

1. It is the Property of Fire, or Heat, to ascend and expand ; of Water, to gravitate and condense.

2. Heat rarifies and increases its expansive Power by Resistance. Water, when rarified, condenses, unites and increases its Power of Gravitation by Resistance.

3. Any given Quantity of Fire or Heat increases by the Resistance and Diffolution of other Bodies, part of which Bodies is chang'd into its Mode, and becomes Fewel to it, acts

upon it, and is acted upon by it, and thus infinitely multiplies its Violence and Quantity.

4. Any given Quantity of Water, by Resistance in its Course, obstructs without Increase, or dilates and deviates in proportioned Streams, through any lesser Channels, which happen to be in the Distance of its Dilation, or in the triplicate *Ratio* of its Quantity, the Point where it obstructs, and the Diameter of the Tube that contains it.

5. Air acts upon Heat, divides its Parts, extends and multiplies its Force.

6. A proportioned Quantity of Water, is the proper and evident Counterforce to the reciprocal Actions of Air and Heat.

7. But the Quantity of Water must be in an exceeded Proportion to the Quantity of Heat and Air, otherwise the recoactive Powers of these Particles will dissipate the Water, or divide its Parts, and make them light enough to be born away in a Steam or Vapour.

8. The component Parts of Water, notwithstanding, so adhere as not (but with the greatest Difficulty, most violent Agitations, and exceeded Proportion of Heat) to be ca-

pable of that Modification or Division of Parts necessary to Heat or Flame. This same Tenacity renders its natural Motion more flow, which, together with its soft and yielding Texture, and its Gravitation, occasions its Involvement, or covering, or stifling the Particles of Heat, and hindring its Action; and this same obvious Combination of Parts, or Quality, renders it ductile, insinuating or penetrative.

9. This Tenacity of Parts, this ductile and insinuating Power renders it effectual to the dislodging, the Suspension or Buoying up, any other obstructing Particles, and conveying them to the proper Outlets.

10. Air, as well as Heat, has not such Power to divide its Parts as those of other Bodies; therefore the Particles of Heat being intimately mix'd or involv'd in it, are less liable to the renewed Impetus of the Air, external or internal.

11. Heat loosens the Texture of Water, and puts it into Motion; therefore when we want to have a Quantity of this Fluid diffus'd over all the Body, a small Proportion of Heat is proper to render it more ductile and penetrative.

From

From these Principles or Facts taken together, it is evident that the Uses of Dilution in this Distemper are to condense the too great Rarefaction, to cool the too much heated, and to stop the too quick Motion of the Blood ; to moisten and relax the dry, parch'd, rigid Fibres, to dislodge and carry off Obstructions from the Vessels. These are the Offices requir'd, and these the Services perform'd, and that not in regard to a particular Part, but the same happy Influences of it are communicated throughout the whole Machine. I shall only further observe, that from what has been said, it is to be given in large Quantities, and gently warmed, and to be continued in suitable Proportion throughout the whole Course of the Distemper.

The Intention of boiling Oatmeal, Barly, Figs, Mallows, Liquorish, or the like in it, seems to be, to stock this Fluid with such a Quantity of soft, yielding, tenacious Particles, as shall still further retard the rapid Motion, and as it were, invellop the Heat ; and being themselves buoy'd up or diffus'd throughout all the Parts of the Liquor, shall insinuate into all the secret Recesses, unite with, and carry off in its Passage, whatever Particles are una-

simulated with the Blood, or obstructs in the Vessels; though after all, I am in doubt whether the simplest Fluid may not best answer the Intentions.

Vomits, or that Power which certain particularly modified Particles of Matter have of irritating upon, inverting the Motion of, or pulling up the Stomach in some manner as to make it throw off its Contents, are attended with the following most obvious Effects. They have a squeezing or compressive Power, more or less, upon all the Parts of the Body, and this Power is remarkably exerted on the several Parts of the Mouth, Throat, Stomach, Head, Lungs and Bowels. The Effects of this Power are visible in the great Discharge that is made from the Glands, or more finely complicated Tubes about the Stomach and Throat, in removing the Sensations of Weight and Sickness on these Parts, when loaded with any offending Matter; in promoting or increasing the fluid Secretions by Sweat and Urine; in discharging Viscidities or other accumulated and obstructing Particles off the Lungs; in rousing and putting into a brisker and more vital Action, the sluggish or lethargick Circulation of the Fluids in the Head,

and in shaking off any gross or latent Particles from the Vessels which occasion it. They distract the Pores, which after every sick Paroxysm recover their former State, and by this alternate Motion, alter, break and remove all obstructing Particles: They accelerate the Blood's Motion, and sometimes rupture the Vessels, occasion Hæmorrhages, or where they already exist encrease them: They are apt to make Persons faint. In this Disease therefore, the Vomit, generally, is best given after Bleeding, for then we not only avoid the Danger of rupturing the distended Vessels, but the compressive Power of the Vomit becomes more effectual to the removing and driving out the obstructing Corpuscles. It is serviceable upon a beginning Inflammation, after Bleeding, even supposing some of the Blood is corrupted, for by means of it they are separated from the rest of the Mass, and afterwards carried off. It strengthens the Vessels, by removing the Load which would weaken them; and by its revulsive Power frees any particular Part from that Weight and Obstruction which would endanger its Rupture and Putrefaction. It ought to be given before
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the Vessels are too much distended, or broke, the Blood too much subtiliz'd, and the thin Parts and natural Strength too much wasted by the long Continuance of the Fever. As it astringes or contracts the Bowels, it is serviceable when Fluxes untimely intervene, and will not yield to the common Method of other Astringents. It must be forborn where there is a Hæmorrhage of any kind ; but where this Disorder does not exist, gentle Emetticks may be administred at any time of the Disease, when any tough or viscid Parts are accumulated in the Vessels ; and there are frequent Occasions for them towards the Maturation of the Flux kind.

Blisters, by their Irritation or Vellication upon the Skin, press and contract the Orifices of the excretory Vessels, and thus squeeze back, or invert the natural Tendency of the Humours outward. By this Action upon the Vessels, if any Particles are lodg'd, and do obstruct in them, they will be remov'd, and their Cohesions broke; and being thus divided and cominuted, will be render'd capable of Discharge, by the larger Canals, which is evident from the Discharge and Separation of Urine upon their Application ;

on ; and likewise by this means a free and open Passage will be procur'd for the obstructed Serum to the Part blister'd, and thus the impeded Circulation of the Fluids will be set free: This Vellication must be successive, not incessant, neither is it probable or necessary that the Orifice of every Pore should be thus struck upon: The vellicating Stroke breaks and divides the adhesive, obstructing Particles, the subsequent Pause gives an Opportunity for their Exit: Though this Action, by consent of Parts, be, probably, communicated over all the Body, as it promotes the Secretions by Sweat and Urine ; yet this vellicating Motion is undoubtedly strongest upon the Part blister'd, and this occasions the great Discharge of Serum upon that Part. The following Phenomena are remarkable upon the Application of Blisters ; they yield, spread over, and closely adhere to the Part ; they pull, heat and smart, separate the Scarf Skin, and draw off a large Quantity of Serum : It should seem that this outward Covering of the Body were spread not only for Defence or Ornament, but likewise to prevent a too great Evaporation of the Fluids, by covering over close the larger and

and numerous excretory Ducts; for, in this case, the Skin being remov'd, an immediate and large Discharge is made of the Fluids, and as is the Nature of fluid Bodies, the Passage being here openest and freest, they pass through and derive from other Parts, whereby Obstructions are remov'd: And undoubtedly the narrow and infinitely small Pores of the Cuticle, even in their natural State, are always a very considerable Hindrance, *in Fevers*, to the Evaporation of the encreas'd or too much heated Fluid, which being still more detain'd, by an unnatural Distension or Contraction of these Pores, by any internal Cause of Heat, or external Cause from Cold, &c. will, in Proportion, more encrease the Fever: Therefore this Power of vellicating, and dividing, evident in separating or loosening the Connexion of this Skin, seems to be the most considerable Office, or the *most immediate* Service from the Blister: As this external Membrane or Skin is compos'd of several Lamina or Coats, 'tis not so probable that the Pores should run rectilinearly through all, or that they should be plac'd exactly, one upon another; and therefore the Particles dissolv'd and steaming out from the

Flies

Flies entering the Pores of the Space it covers, may press, strike or vellicate different Ways, and thus loosen its Connexion. It does not appear that there are any Blood Vessels distributed through this Skin, but that it is lubricated or nourish'd only by the perspirable Matter, for if there were, the Blood contain'd in them, must either be press'd quite out of them back into the Vessels, or the Serum must be ting'd, or the Blood must be cominuted or chang'd into that Substance by the Vellication, which is not likely enough to suppose. Blisters do not, further, encrease the Fever but abate it, on this Account, that they procure a freer Passage for the Heat to expire. The principal Use of them seems to be, to revulse, divert, give a freer Passage, and draw off the obstructing heated Fluids; and this the immediate Use of Blisters in swell'd and inflam'd Tonfils, Uvula, or in any other part, abundantly evidences: And as the Particles first insinuate themselves, before they get into the Blood, into the Orifices of the Glands, or convoluted Arteries, through which the more fluid part of the Blood secretes, they must strike upon, or vellicate the Sides of those Ar-

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teries,

teries, which, by their Communication with the *larger Vessels*, vellicate, and thus contract, or encrease *their* Elasticity, and consequently give a greater Force to the Blood's Pulsation, or raise the Pulse. That they do contract, is evident from their causing the Strangury, or a Stoppage of Urine. And therefore in a Languor, Stupidity, or any other Symptom attended with a faint, labouring or irregular Pulse, it should seem most proper, from all which has been said, to apply the Blister to the Region of the Heart and Lungs, as these are the Parts peculiarly instrumental in communicating Heat and Motion to the Blood. So where the Patient is in danger of Suffocation, the Part Nature directs to be blister'd is the Throat, and down to the Breast and Stomach; as likewise, when the first Symptoms forebode a thick and small Sort, a Blister upon the Head seems very proper to prevent a too full Eruption upon the Face as well as Deliria, and other dangerous Disorders.

Purging seems only proper (at least, till the going off of the Disease) where the military Obstructions are so very great as to defeat
every

every Intention and Endeavour of throwing out the Distemper by the Pores, or at least, where the other Evacuations do not prove sufficient.

Dr. *Holland* has an intire Chapter set apart for the Recommendation of *Bezoar-mineral* in this Disease. One would naturally hope to have been obliged with his Considerations on the Nature, and his own, or his *experienced and understanding Nurse's* (p. 2.) Observations, as to the Efficacy of this Medicine, which might have been of *some Weight* to have determined the Use of it ; but, perhaps (which he seems to intimate, p. 132.) as there is none but himself a *proper Judge of plain Instances of its good Effects*, so he may, with equal *Modesty and good Manners* (see the Dedication) imagine, there is none capable of discerning the Force of his elaborate and subtile Reasonings about its Nature and Properties, The Sum of this instructive Chapter is to inform us, that 'tis the Doctor's Opinion (*Heus! cedit omnes*) this Medicine *has not been used as it deserves* ; that himself is the only Judge of its Merits ; that he is no Empirick ; that *there are six great Remedies, that two of*

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them, *by the Help of Fire and a strong Acid*, make his favourite *Bezoar* ; that it is an excellent *Medicine*, that *Dr. Bates, Silvius, and Riverius* recommend it ; that (*risum teneatis*) the great *Difficulty in Physick*, is to cure *Distempers* ; that every Body ought to imagine, he understands the Constitution of a Patient he has once seen, better than an old Doctor who has been long us'd to it ; that the best Medicines may be mischievous in less *skillful* Hands than his ; that there is nothing got by buying bad Medicines ; that though *some* particular Members are Knaves, yet that the whole Company collective, of Apothecaries, are *all* worthy, honest Men, are obliged to him for this Compliment, and therefore, in Gratitude, ought to render him all the Service in his Profession, which he may *want*, expect, or is in their Power.

But to consider the Medicine a little more distinctly than the Doctor has thought fit to do. It is made of the Butter of Antimony and Spirit of Nitre ; the former of these from Corosive Sublimate and Antimony ; the Sublimate, from Vitriol, Mercury, Salt, and Salt Petre ; so that it is an antimonial, saline,

line, nitrous, vitriolick and mercurial Preparation ; or rather by all the various Changes it undergoes in this multiply Operation, it is a perfect Ignotum, and requires the strongest Exertion of the Doctor's Learning and Skill to explain its Virtues.

The Sublimate is what is raised by the highest Degree of Fire, into the Neck of the Vessel, from calcin'd Vitriol and Quicksilver, of each one Part ; of Salt, and Salt Petre, of each half Part ; reduced and divided into the subtilest Powder ; so that this is a Quadruple Medicine, consisting of the finest Particles, blended together in a Proportion of two to one of the Vitriol and Mercury, Salt and Salt Petre.

The Butter of Antimony is made from the foregoing Composition, and Antimony, intimately powder'd and mix'd, equal Parts, by the Help of a Fire of the second Degree, which raises the lightest, most subtile, and separable Parts. 'Tis hard to define the Proportion of one to another here, and therefore, as we cannot ascertain its Nature, 'tis impossible to determine its Effects by Reasoning. One would imagine, from the Nature of *Mercury*, and the Degree of Fire, that *it* should bear
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the greatest Proportion ; suppose three, to two of the Antimony, one and a half of Nitre and Vitriol, and one of Salt.

The *Bezdar-mineral* is prepared from Butter of Antimony, and Spirit of Nitre, of each equal Parts, the Spirit of Nitre drawn off in a gentle Heat, returned again with an Addition of the same Spirit, and this Operation repeated four Times; then the remaining Mass to be powder'd, calcin'd, and edulcorated by washing and burning with Spirits of Wine four Times. I cannot help thinking that the last Operations of calcining, washing and burning it, are what only fit this Medicine for internal Use: All the caustick Salts in the Butter of Antimony, are raised by a Fire of the second Degree : The Fire in the Process of making the Bezoar, is not equal to it ; so that after all the repeated Operations with the Spirit of Nitre, we have still a Caustick left behind ; unless by the Alteration of its Parts by Fire, that Quality be removed : And to what Purpose is this repeated Process of drawing off, and returning again the Spirit of Nitre ? Is it (which is the only probable Reason I can form) to put the component Particles into a different Form and Scite, and to change

change its Nature by this repeated Fluctuation or Fusion of Parts ? But then what other Quality does it get ? One may suppose, that by these frequent Elaborations by Fire, together with the consequent Powdering, Calcining, Washing and Burning, the Caustick Qualities it had obtained, by the foregoing Processes, are evaporated and washed off ; so that it seems like *laboriously undoing* what was before as *laboriously done*. In short, if one could vouch for this compound Preparation, that it did participate in some known Proportion and Degree of the several Particulars that enter in all the Processes of it, it would even then, only perplex the Prescriber ; and therefore 'tis under the dark Shade of a profound Ignorance of its Nature, or a chymical Enthusiasm from the involved and mysterious Processes it has laboured through, that it is recommended as a Remedy in any Case, to be depended on. Much the same may be said of many other Compounds, which long Antiquity, a Veneration for Names, and a Fondness or Prejudice for old Customs, still continue in Use. Further, with respect to this ; here is either a Heap of Particles blended

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ed together, on the single Qualities of each of which we are to depend, or else on some one or other, and different Quality occasion'd by these many Processes, this different Combination or Alteration. As to both of these, I presume, we may be yet in the *dark*, with respect to any Illustration or *Light*, which the Doctor has vouchsafed to *bold to us* on this Subject. Had he discovered any remarkably evident Properties it is endued with, either as to Magnitude, Weight, Configuration, Subtlety, Volatility, Pungency, &c. Had he described its most sensible Effects, as to Sharpness, Bitterness, Heat, Cold, and the like; Had he given us a particular Account, in what precise Manner it constantly operates on the Body; Or lastly, Had he given us a faithful Narration of Cases, wherein it had been evidently serviceable, these Things might have been sufficient to have procured it Reputation, and brought it more universally into Practice; but a meer *ipse dixit*, though of Dr. *Holland's*, will never clear up Things, which, in their Nature, are dark and uncertain. When we reason about the Use of Medicines, if we would talk to be understood, our particular

ticular Ideas, and Words, must be determinate
 and confin'd ; there must be something self evi-
 dent, either in Notion or Fact, to lead us on in
 our Gradation of Reasoning, and to the form-
 ing Conclusions ; for whoever frames an Hy-
 pothesis, not evident in it self, will be led on by
 an *ignis fatuus*, and be ever liable to the *Diffi-*
culties and Dangers of Error, in his Reason-
 ings from it ; for the Deductions must ne-
 cessarily be, at least, equally uncertain with
 their Principle ; Indeed, 'tis next to impos-
 sible to reason with any Degree of Certain-
 ty, of the Uses of many compounded Reme-
 dies, in respect to any particular Symptom of
 a Disease ; and especially, when this Remedy,
 thus blended and mix'd, has undergone many
 Changes and Alterations in the Process of its
 making. For *First*, If it is barely mixed,
 then there are so many Properties (supposing
 all the Ingredients to be different) as there
 are Ingredients ; and *this* must perplex, in
 great Measure, that Uniformity of Intention,
 dependant on the apprehending the prime
 Source of a Distemper, and requisite to cure
 it ; for contrary Intentions we cannot suppose
 to be answered at the same Time ; and the
 I giving

giving many Things of the same Quality, and with the Design of answering the same Purpose, takes from us the Certainty of knowing to which of them we ought to ascribe the Success we desire, or obtain. If, on the other hand, *Secondly*, the Whole be altered, then there is another Quality to be rely'd on, different from any single Ingredient, or the Whole of the Composition ; but all the Alteration a Medicine or Medicines can undergo, will never give a different Property, from what a simple or single Ingredient may be endued with, and which will occur to our Senses in the Use ; And therefore, with Respect to the First, I believe I may assert, that in most Cases, there is Regard had to one principal Symptom, and therefore one principal Intention to be first answered ; and certainly one Ingredient may answer this one Intention alone ; unless we can suppose, as before mentioned, that a Combination of Particles, of different Qualities, will produce some other Quality, not to be found in simple Ingredients ; but I suppose this may be deny'd till we have some new Ideas of Bodies differing from those we have already had, and till compounded Bodies can
be

be produced, which will furnish those Ideas, inasmuch as Weight, Tenacity, Volatility, or a Capableness of being finely and soon divided, Austerity, Bitterness, Pungency, and every other known Quality of Bodies, upon some or other of which all their Effects depend, are to be found in simple Ingredients.

Let us consider, as a Recapitulation, this Theory as put in practice in the Distemper we are treating of.

To relieve under the violent Symptoms on the first Attack, such as Pains all over the Body, quick and short Breathing, &c. the one Intention from the heated, rarified Blood, is answer'd by Bleeding. * The violent Sickness by Ipecacuanna. Drowsiness, or Convulsions in Children, from the obstructing Fluids, by the same, or by Blisters. The

* *A gentle Vomit is proper to be given at the beginning of any febrile Indisposition, supposing there be no previous Nausea or Sickness. For if at such a Time, the Aliments already in the Stomach, should not be sufficiently attenuated or prepared, they will be transmitted thence, crude, or in too large Particles, or not duly blended or combin'd, which will create new Obstructions either in the Lacteals, or other Vessels, and thus will encrease the Distemper.*

Heat and Drought, by cooling Liquids. The too great Subtilization of the Blood, by *Acids*. Restlessness, by *Diacodium*. The Eruption impeded, or struck in, by Blisters, or a Vomit. Any other Symptoms occasion'd by want of a freer Perspiration, by *Campbor*. And here influenc'd by the Example, and shading my self under the Authority of this *great* and *most learned Writer* I am considering, I shall take the Liberty to recommend a more constant and free Use of this Medicine to you. Its sensible Qualities are a superficial Softness or Smoothness, unctious, light, extremely volatile and penetrative; it burns with a slow, equal and gentle Fire, is remarkably serviceable in taking off the painful Contraction of the Strangury, and promoting the Discharge of Urine; I have now a Case before me, in which it was happily successful in procuring Sweats after the Patient had lain ten Days in a violent Burning, with a high Pulse, and without the least external Moisture, after Bleeding, Dilution, and a moderate Use of the common Sudorificks. Its Nature would incline one to think it capable of penetrating through the most violent Obstructions to the

the Out-lets, without encreasing the internal Heat or Agitations; and nothing seems more proper to support or restore the pustular Eruption in this Disease, or to promote by the Skin a free Discharge of those separated Particles necessary to be thrown out. The Parts of Camphor are so very light, so easily and finely separable; so penetrative, soft and unctious, as not to be capable of encreasing the internal Agitations by any Weight or Force of its component Particles; but gently gliding through all the winding Meanders, insinuating through every Pore, or pervading through every Medium, in the most subtle Exhalation, finds an easy Passage for it self; and without abrading from the Vessels, or obstructing in the Interstices, without any painful or heating Stimulus, or rugged, or woody contractive Quality, has all the Virtues of the most powerful Sudorifick; makes way for the detain'd Fluids to perspire; and thus abates the rapid Flames, and preserves the Machine from its threaten'd Destruction.

Having continued my Letter to this length, I shall conclude with an Observation on the Cause and Cure of an intermittent, and the Dif-

Difference between this and a continual Fever.

The Bark (it is commonly said) cures an intermitting Fever by its Astringency. This supposes a Relaxation necessary to the Distemper.

In the Fever there is Heat and Drought of the external and internal Parts, and Shortness of Breath, which denote a Rarefaction, the Consequence of Heat ; a quicken'd Pulse, the Blood being carried more violently on in the larger Arteries.

That 'tis a Removal of Obstructions which carries off the Fever, is evident from the Sweat, and the Abatement of every Symptom in consequence of this Sweat, which constantly attends an intermittent, so that it is occasion'd by a Relaxation, an increas'd Heat and Obstructions.

When the Obstructions, occasion'd by the Relaxation and increas'd Heat, are remov'd, the Fit goes off, and for some Time, the Passages being clear'd, the Fluids circulate freely : but the Vessels being still relax'd, much of the thin Parts being evaporated by the
fore-

foregoing Fever and Sweat, the Fluids must circulate slowly and be fizy ; the Obstructions must return with the Heat and other Symptoms, till they are again broke through, and the Vessels some how or other recover their Tone.

This Relaxation may be occasion'd by any adventitious Moisture (like a wet Chord of an Instrument.) The Bark may lodge, or stick in the Interstices of the Tendons, or where the muscular Fibres unite, and thus shorten their Extension: Or it may contract, and unite the Blood Globules, and prevent them from such a Subtilization as is necessary to the Fever and Rarefaction ; or both.

A continual Fever seems to arise from Heat and Obstructions only. It is true, by a long Continuance of this Rarefaction, the Vessels become weakened, and an Intermittent is produc'd ; and this confirms the foregoing Theory, as likewise the Consideration, that the great Frequency of intermitting Fevers in the Country, is, when the Season is changeable, wet, hot, cooler, dry, or as *Rhazes* observes, after a wet Summer, or warm Winter,

ter, and the Body expos'd to the Injuries of
this Variation and Intemperature.

Thus, *Sir*, you have my hasty Thoughts
on the Nature and Cure of this Distemper;
if it should meet with your Approbation, I
shall reconsider it, and endeavour more fully
to explain and establish it, by a second Let-
ter, and more enlarged Reasonings.

I am, *Sir*,

Ec.

John Chandler. an Apothecary.

